

FROG CALL



THE FROG AND TADPOLE STUDY GROUP NSW Inc.

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NEWSLETTER No. 133 October 2014

Stephen Mahoney Watagans *Litoria phyllocroa*



Arrive 6.30 pm for a 7pm start.

Friday 3rd October

**FATS meet at the Education Centre,
Bicentennial Pk, Sydney Olympic Park**

Easy walk from Concord West railway station and straight down Victoria Ave.

By car: Enter from Australia Ave at the

Bicentennial Park main entrance,

turn off to the right and drive

through the park. It is a one way road.

Or enter from Bennelong Road / Parkway.

It is a short stretch of two way road.

Park in p10f car park, the last car park

before the exit gate.

MEETING FORMAT Friday 3rd October 2014

6.30 pm There are lost frogs (*Litoria caerulea*, *Lt. infrafrenata* and *Lt. gracilentia*) needing forever homes available to FATS financial members. Please bring your FATS membership card and cash \$40 - \$50 donation. Your current NSW NPWS amphibian licence must be sighted on the night. Rescued frogs can never be released. Sorry we have no EFTPOS at meetings. Please contact Monica before the meeting to confirm your interest in adopting a rescued frog.

7.00pm Welcome and announcements.

7.45 pm Chris Jolly from Sydney University has been working on native animals and training them to avoid toads. His talk is entitled "Defending Native Animals from Cane Toads."

9.15 pm Show us your frog images, tell us about your frogging trips or experiences. Guessing competition, continue with frog adoptions, supper and a chance to relax and chat with frog experts.

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FATS MEETING 1ST AUGUST 2014

Marion Anstis opened the meeting with a welcome to everyone. The Frog-o-Graphic Competition is now open so please e-mail your photos or scans of artworks to photos@fats.org.au Closing date 15th September. Herpetofauna magazine publishing is behind schedule so a refund of \$10 will be made with next membership if none are printed this year. An honorary editor for Herpetofauna is needed. Robert reported that NPWS may be imposing a charge on Field Trips into some National Parks.

Kathy Potter urged members to help out or just attend upcoming events:

Science Unleashed Sat 16th August Australian Museum

Ku-ring-gai Wildflower Garden Festival 31st August St Ives

Bird Fair 25/26th October at Newington Armory, Sydney

The Annual General Meeting dealt with the election of the Committee. Nominees were all elected unopposed. See Committee list for details. Arthur White delivered the President's Report and noted that members enjoy talking about frogs at public events and their willingness to volunteer made his role an easy one. He thanked the committee and especially the Treasurer, Karen White. Karen's financial report followed.

Arthur White presented "Australia's oldest fossil frog" about many exciting fossil amphibian locations including Lake Palankarina and Naracoorte, SA; Kangaroo Wells, NT; Riversleigh, Murgon and Geebung in Qld and Lightning Ridge in NSW.

George Madani in "Ancient amphibians of Sydney" noted that the *Paracyclotus davidi*, a 2.3m long, 235 myo labyrinthodont now in Natural History Museum, London, was found in St Peters brick pit, Sydney, in 1910.

Grant Webster "Pseudophryne - The Bold and Beautiful Brood-frogs of Australia" showing the diversity of the 14 recognized species which breed on land near water. They create nests and tadpoles develop within the eggs. There may be 5 or so undescribed species as DNA comparison trees for *Pseudophryne bibronii* show large diversity over geographic areas.

Kim Rudder showed frogs in his Maroubra native garden, including persistent striped marsh frogs capable of climbing up lattice to breed in large tubs.

Thank you to all of the speakers for such a varied program.

Wendy Grimm



**The Australian Reptile Park,
Pacific Highway, Somersby
(02) 4340 1022
<http://www.reptilepark.com.au/>
will hold its**

INTERCLUB CHRISTMAS PARTY

on Sunday 7th December 2014 from 10 am to 3 pm, hosted by John Weigel. This once a year get-together of the herpetological societies is an event not to be missed. Contact the ARP to confirm the date and times of the event. Free entry to FATS members. Please take your current FATS membership card as proof of membership. **MW**



Uperoleia rugosa Wrinkled Toadlet



Photo by George Madani



PRESIDENT'S REPORT

2013-2014 has been another good year for FATS. We have managed to participate in many public events, hold several field trips, contribute on governmental panels and generally have a good time.

FATS is also financially strong, thanks to our long-standing Treasurer Karen White. Because we are so sound, we again offered student research grants this year. Applications for the grants are currently being considered.

FATS held a number of community activities this year including various garden clubs and, frog activities at the Kuring-gai Wildflower Centre and Narrabeen Wetlands, as well as being at the Easter Show. We also participated in Science in the City at the Museum during Science Week. Great thanks are given to Kathy Potter and family for organising most of these events.

FATS also undertook the annual Bell frog auditory surveys at Sydney Olympic Park in November and December. Thanks to SOPA for supporting FATS.

FATS is a member of the NSW Govt's Advisory Committee on Native Animals, as well as the Task Force for Cane Toads in New South Wales. We were the major contributors to the production of a cane toad eradication plan for NSW.

Robert Wall organised a great series of field trips that are always well attended. These are for anyone who wants to come - you don't have to be frog know-all to attend. But make sure that you get your name down on the attendance sheet as quick as you can after the trips are announced or else you could miss out.

Monica, our editor, has been busy as always, putting out FrogCall, our flagship publication. It is a great credit to her and a wonderful means of getting frog news around. Our special December colour editions are keenly sought by non-members.

Many thanks to our other executive members: Wendy and Phillip Grimm, Marion Anstis, Andre Rank, Lothar Voigt, Punia Jeffery, Vicky Deluca, Jilli Streit and Robert Wall. Each has contributed whole-heartedly and helped keep FATS alive and well.

This year Punia Jeffery will be stepping down after serving for quite a while as our Chairperson. Her efforts have been greatly appreciated.

Another special thanks to our web site Manager: Phillip Grimm. Phillip's efforts have turned our web site around to become one that is current and much more presentable. If you haven't seen the revised web site please do so. Any feedback that you want to give us is welcome. Thank you Phillip for all the time and effort that you put into our website.

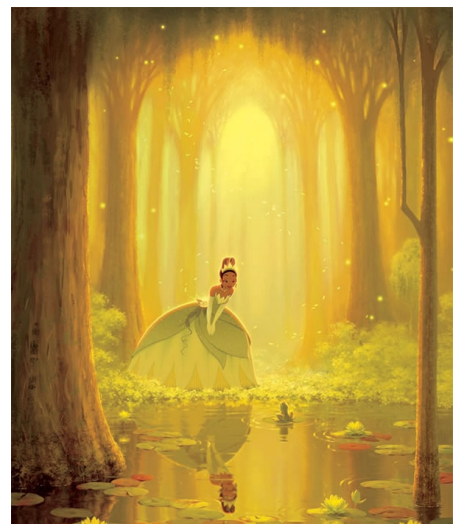
Another big thanks is due to Judy Harrington who helps with the room set up each meeting and is a staunch FATS ally. Thank you Judy.

Of course, I would like to thank all of our members for making FATS such a great group to be in. People who are friendly and helpful really make it a pleasure to run an organisation like FATS.



Photo by George Madani Fat *Notaden*

One last point: When FATS first formed over 20 years ago we held our public meetings at the Australian Museum. Because of the demand for space at the Museum we were forced to vacate that venue and were fortunate to find a home at Sydney Olympic park. With significant changes to the administration of the Museum we have been asked if we would like to hold some of our meetings at the Museum again. I will return to this issue in General Business as I would like to hear your thoughts about this. **Arthur White**



From Jilli Streit Princess and the Frog movie

George Madani *Heleioporus australiacus*



Photo by David Nelson *Litoria (Cyclorana) cultripes*

**FROG & TADPOLE STUDY GROUP
STATEMENT OF INCOME & EXPENDITURE
FOR THE YEAR 01/07/2013 – 30/06/2014**

	01/07/2013 – 30/06/2014		01/07/2012 – 30/06/2013	
Opening Balance	<u>\$ 9907.24</u>		<u>\$ 25290.45</u>	
Income	\$ 1605.99	Interest	\$ 1316.52	
	\$ 6325.00	Membership	\$ 5220.00	
	\$ 400.00	Donations	\$ 665.00	
	\$ 2000.00	Grants (SOPA)	\$ 2000.00	
	\$ 1199.00	Sales (books etc)	\$ 1114.00	
	\$ 612.00	Raffle /Auctions	\$ 597.00	
	\$ 930.00	Rescue Frog Sales	\$ 525.00	
	\$ 920.00	Field Trip Income	\$ 1285.00	
	\$ 1000.00	Community Day Income	\$ 150.00	
	\$ 1408.50	Workshop Income		
	\$10000.00	Mature Term Deposit		
Total Deposits	<u>\$26400.49</u>		<u>\$ 12872.52</u>	
	<u>\$36307.73</u>		<u>\$ 38162.97</u>	
Expenditure	\$ 7.00	Bank Fees	\$ 6.00	
	\$ 52.00	Dept of Fair Trading	\$ 51.00	
	\$ 715.00	Insurance		
	\$ 720.50	Printing – Sundry	\$ 1758.43	
	\$ 3381.47	Printing – FrogCall	\$ 4396.64	
	\$ 1435.60	Postage – FrogCall	\$ 1211.98	
	\$ 77.94	Stationery	\$ 52.75	
	\$ 158.00	Post Box Hire	\$ 146.00	
	\$ 824.00	Field Station Hire	\$ 1198.00	
	\$ 924.00	Herpetofauna		
		Sales – Expenditure	\$ 1660.25	
	\$ 2159.03	Sundry Expenses	\$ 2591.33	
	\$ 564.05	Photographic Comp	\$ 673.35	
	\$ 110.00	Subscriptions (NCC)	\$ 110.00	
		Mobile Phone	\$ 1859.00	
		Student Grant	\$ 1000.00	
	\$ 726.78	Workshop Expenses	\$ 168.00	
		Donations	\$ 200.00	
	\$ 1418.98	Live Food – Rescue Frog	\$ 1173.00	
		Term Deposit Transfer	\$ 10000.00	
	\$ 10000.00	Publishing Costs		
Total Expenditure	<u>\$ 23274.35</u>		<u>\$ 28255.73</u>	
Closing Balance	<u>\$ 13033.38</u>		<u>\$ 9907.24</u>	
TOTAL FATS ASSETS				
Cash in Bank	<u>\$ 13033.38</u>		<u>\$ 9907.24</u>	
Term Deposits	<u>\$ 37114.65</u>		<u>\$47114.65</u>	
Total	<u>\$ 50148.03</u>		<u>\$57021.89</u>	

Facebook contains many special interest pages including the FATS page with 1,067 members. See front cover for link address. Below is a copy of HerpDigest's international Facebook page, in 2013, promoting Marion Anstis' reference book *Tadpoles and Frogs of Australia*. Within weeks, hundreds of people had registered to purchase her book. This encyclopaedic work is a must have for frog lovers and a great Christmas present!

HERP DIGEST .org

Allen Salzberg
(Avrum Simcha)

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About

- Publisher at HerpDigest**
January 2000 to present
- Studied Theater and English at Herbert H. Lehman College**
Bast...Broox, High_School_of_Science
- Lives in New York, New York**
- From New York, New York**
- Married to Anita Salzberg**

HERP DIGEST .org **Allen Salzberg**
6 minutes ago

Tadpoles and Frogs of Australia

By Marion Anstis
This 816 page book, with hard cover and dust jacket, will include 500 limited edition, numbered copies signed by the author, with additional regular copies. The book covers all adult frogs and includes illustrated descriptions of the eggs, tadpoles and metamorphs of most species, with keys to tadpoles and eggs. Full colour throughout, including over 3,060 photos and drawings, it is a must-have reference for amateurs, students and professionals.

To secure your order, go to <http://www.newholland.com.au/authordetail.php?first=Marion&last=Anstis&number=264> for instruction. Please complete your credit card/cheque details below. Price \$145 including postage within Australia. For overseas orders, please include your email to confirm postage price.

Released: September 2013

Tadpoles and Frogs of Australia
Marion Anstis

Michael McFadden Joy Kuligowski Sameera Suranjan Karunaratna
Corey W Dick Bartlett Anfibios Argentina
Serge Pasquasy Sandeep Verma Richard Wells

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Litoria fallax photo George Madani



HERPDIGEST

METABOLIC BONE DISEASES IN REPTILES AND AMPHIBIANS | CALCIUM BALANCE

Captive reptiles and amphibians are subject to a somewhat unique situation. Unlike our mammalian companions, they're highly dependent on their captive environment for their most basic physiology to function, making good husbandry the key to maintaining healthy companions. One of the most common health problems we see in captive herps relates to calcium metabolism: The infamous "metabolic bone diseases," often abbreviated as MBD in both lay and professional literature.

I feel this is a suitable topic to start with in what will be a series of health and medical columns, as it's (in my opinion) one of the saddest syndromes we treat in captive herps. It's entirely preventable in all but the most obscure of cases, and metabolic bone diseases essentially *do not* occur in wild animals. Often, early clinical signs are subtle and go unnoticed by most hobbyists. Prevention at the level of diagnosing husbandry errors before they promote a disease process is key (and that applies to all husbandry-related pathologies in captive herps). My goal, is to give our readers a basic understanding of the complexities of this disease process (and others in the future), and how to apply this understanding to your husbandry techniques.

This subject is of course very complex. In fact, "metabolic bone disease" does not actually refer to one pathology, but a series of syndromes that affect bone form and function (Mader 2006). The most prevalent form of metabolic bone disease that we see in captive herps is nutritional secondary hyperparathyroidism (NSHP- because it's really quite a mouthful when you say it out loud). Before we delve into the meaty medical and husbandry stuff, understanding the bodily processes that are involved in using dietary calcium

is the first step. There are a lot of intricate details to calcium metabolism, and just because a herp is getting calcium in their diet, that does not necessarily mean that they can use it appropriately.

Calcium and Reptile Relationships Back to basics: Calcium in the body Calcium, simplified, is an element in our diets, important for the health of bones, teeth, and muscles. It's a major component in the structure of both bones and teeth, contributing to the mineral-like rigidity of these body parts. It's also heavily involved in cellular signaling and blood clotting (Wedekind et al. 2010). The most prominent effects of problems with *calcium metabolism* in our captive herps involves first the structural component of the skeleton, and second the ability to maintain cellular signalling.

Calcium in our bones and teeth (about 99% of the body's calcium) is in flux with the calcium in our blood (the remaining 1%) (Wedekind et al. 2010). While we tend to think of our skeletons as mostly inert and unchanging after we've reached adulthood, bones are constantly being broken down and built back up again by a series of cells called osteoclasts and osteoblasts. Osteoblasts create new bone out of calcium, *phosphorus*, and other components, and once they've become trapped in their own mineral matrix they are called osteocytes. Osteocytes can transform to break down bone (now called osteoclasts) so that bone can be remodelled and those components can re-enter the bloodstream (Colville and Bassert 2002).

While this seems like a lot of detail to go into, I assure you understanding the skeleton is not a static, unchanging structure is an important concept.

Many cellular signals rely on calcium moving in and out of cells, usually involving proteins that act as pumps to move calcium across the cell membrane (Alberts et al. 2008). The most relevant cell signalling for our purposes involves muscle contractions, both voluntary (used for conscious movements) and involuntary (such as cardiac muscles responsible for maintaining blood flow). In short, calcium is stimulated to enter the involved cells by an electrical stimulus (called an action potential) from the central nervous system. This initiates a chain reaction in submicroscopic muscle fibre structures that results in muscle contraction (Colville and Bassert 2002). Without adequate levels of calcium in the blood, problems with muscle contraction occur (as well as with the uncountable other cell processes involving calcium).

Calcium homeostasis As mentioned above, calcium moves back and forth between bones and the bloodstream, and these processes are very tightly controlled by multiple organs.

First and foremost, the concentration of calcium in the blood is the major driver of all of the following processes. When calcium is used for bone building/remodelling, in signalling molecules (like neurotransmitters), and some cellular processes, this depletes some of the free calcium in the blood (Colville and Bassert 2002). When the ionized calcium concentration drops below a specific concentration, the parathyroid gland (located in the neck of all vertebrates except fish) reacts by secreting parathyroid hormone (Wedekind et al. 2010).

Hypercalcemia in Reptiles Parathyroid hormone, which we'll abbreviate as PTH, works several ways to correct hypocalcemia (see Figure 2 for a diagram version of the following):

1. PTH induces osteoclastic activity in bone tissue by binding to osteoblasts and causes them to transform into osteoclasts. Osteoclasts initiate bone resorption, which release stored calcium (and phosphorus in the form of phosphate) into the bloodstream.
2. PTH acts on the kidneys to recuperate calcium (as well as magnesium) that would have been excreted in the urine, and increases phosphate excretion into the urine. (Calcium and phosphorus have a close relationship, but we'll explore that topic more, later.)
3. PTH initiates another cell signalling process in the kidneys to help absorb calcium from the diet. This part involves the vitamin D3 metabolism process, which we'll touch on soon. Essentially, the intestines receive a signal to let more calcium into the bloodstream from food in the animal's gut. Note that there is always some passive absorption of dietary calcium, but it alone is not adequate to correct hypocalcemia (Wedekind et al. 2010).

parathyroid glands will release the hormone calcitonin. Calcitonin causes the opposite of PTH's functions (refer again to Figure 2 to see this in diagram form):

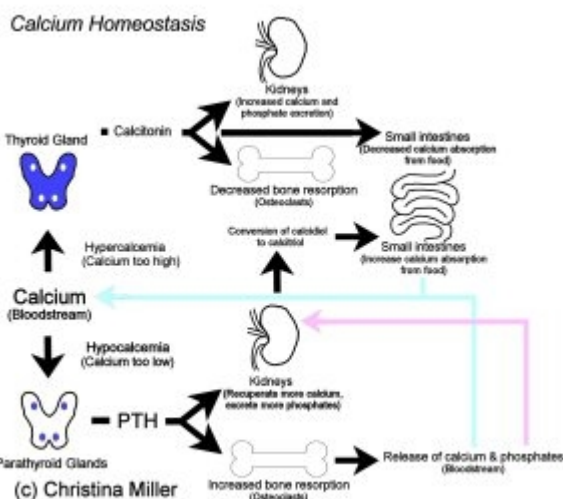
1. Calcitonin inhibits osteoclastic activity, slowing bone resorption. It also stimulates osteoblastic activity, causing calcium to be redeposited into bone tissue.
2. Calcitonin inhibits calcium resorption in the kidneys, causing more calcium to be excreted in the animal's urine. However, it copies PTH in that it also inhibits phosphate resorption, so that more phosphates are also excreted in the urine.
3. Finally, it inhibits calcium absorption from food in the intestines (Colville and Bassert 2002).

Phosphorus and Calcium Phosphorus and calcium are intricately linked in nutrition. Phosphorus, like calcium, makes up a large structural component of teeth and bones, so when osteoclasts initiate bone resorption there is release of phosphorus in addition to calcium into the bloodstream (Colville and Bassert 2002), and recall that PTH will stimulate the kidneys to excrete more phosphates to avoid phosphorus levels from climbing too high. Hyperphosphatemia (high blood levels of phosphorus) is dangerous. Chronic hyperphosphatemia leads to soft tissue mineralization, among other problems (Thrall et al. 2004).

These two nutrients like to stay within certain proportions of each other in the bloodstream; there exists a relationship between calcium and phosphorus concentrations, and the pH of the blood. When too much phosphorus is absorbed from the digestive system into the bloodstream, the calcium in the bloodstream declines in relation to the phosphorus as it's "forced" to precipitate as calcium phosphate (Thrall et al. 2004). Not only are the total amounts of calcium and phosphorus in the diet important, but their proportions to each other is also *critical* when it comes to calcium balance. The calcium-to-phosphorus ratio is critical in diet assessment (Wedekind et al. 2010), and we'll touch more on this topic later.

So, we've seen that the body runs a pretty tight ship when it comes to calcium and phosphorus. It has ways to regulate how much calcium is in the bloodstream through those two hormones, PTH and calcitonin. The main way the body replenishes used up calcium (and any nutrients) is through the diet. If an animal is provided with a calcium-deficient diet, then they will be unable to replenish that lost calcium. But, as noted above, there's another key factor in calcium metabolism that we still need to explore: Vitamin D3.

D3: The "sunshine vitamin" In response to low blood calcium levels, PTH signals through a series



Calcium Homeostasis in Reptiles

If PTH starts this sequence but blood calcium cannot reach adequate levels, the parathyroid gland continues to be stimulated to produce PTH, resulting in a negative feedback loop that will not stop until the hypocalcemia has been corrected.

If and when blood calcium levels rise too high (hypercalcemia), the thyroid gland, found next to the

of reactions to the intestines to start absorbing more calcium from food in the animal's gut. PTH signals to the kidneys to initiate the absorption process, but this is hardly where the story of vitamin D3 begins.

Basking isn't just for thermoregulation. Basking under both a heat lamp and a UV-B producing bulb so that he may create endogenous vitamin D3. This process is simplified in some species. They eat another animal that already contains pre-formed vitamin D3 (also called cholecalciferol) that is transported to the liver and transformed into calcidiol (a prohormone). When the kidneys are stimulated by PTH, they start to convert calcidiol into calcitriol (a hormone), which is the active form that signals to the intestines to start absorbing dietary calcium (Colville and Bassert 2002). Note that all of these compounds have alternate names in the literature, as well as chemical names. I've included an appendix (Appendix 1) for those who are interested in case you happen to see these synonyms in the literature.

In most species, the process is a little more complicated. Many animals synthesize their own vitamin D3 in the skin in response to sunlight, which is why D3 is often called the sunshine vitamin. Previtamin D3, found in the skin, reacts to sunlight and forms D3, or cholecalciferol (Colville and Bassert 2002). The process then continues as above. Sometimes this process is complimentary to what's absorbed from the diet, but in some species this is their only source of vitamin D3.

With captive herps, this is where many of our problems occur. We know from trial and error in herpetoculture that many species require an aspect of sunlight, ultraviolet-B radiation (UV-B), in order to make their own vitamin D3. Failure to provide UV-B lighting results in the animal not being able to use calcium in their diet, which leads to metabolic disturbances.

Calcium Absorption in Reptiles Linking physiology to disease The above processes are a lot to digest (no pun intended). Let's break down some common scenarios that occur in captivity, and relate pathology to physiology:

- There is not enough available calcium in the diet. This occurs either when the animal's diet simply contains insufficient amounts of calcium, or the calcium in the diet has a poor bioavailability. The first scenario is simple: Not enough calcium. This occurs when an animal is being fed primarily calcium-poor prey items or plants. Insectivores, for example, tend to suffer when their insect prey is not gut-loaded and/or dusted with calcium, as most insects have a naturally low calcium content (Donoghue 2006).

The second scenario involving calcium bioavailability can be quite variable, and to understand this we need to take a detour into some general food science. The bioavailability of a nutrient (be it calcium, a carbohydrate, zinc, a protein, etc.) is evaluated by how much of that nutrient is absorbed from a food and is transported unchanged into the bloodstream to be used by the body (LPI 2014). For example, calcium carbonate, the most common form of calcium in reptile and amphibians powdered supplements,

is less bioavailable than calcium citrate, another form of calcium supplement (Hanzlik et al. 2005). This means that if the same amount of each supplement were ingested by two separate animals, the animal who ate the calcium citrate would absorb more useable calcium compared to the animal that ate the calcium carbonate. This of course does not mean that calcium carbonate is a poor choice for supplements, but this aspect of any nutrient is important when assessing diets.

Furthermore, the presence of other foods in the diet can reduce how much calcium is being absorbed into the bloodstream. Calcium antinutrients are a loosely-defined group of naturally-occurring chemicals found in many common fruits and vegetables. They bind to calcium in the digestive tract, and stop it from being absorbed by the body. Common examples include oxalic acid and phytic acid (sometimes referred to as oxalates and phytates), which are chemicals found in many vegetables that are commonly eaten by both people and pet herbivorous or omnivorous reptiles. Both compounds will bind to dietary calcium and form compounds that will not be absorbed, but will be excreted instead (Charles 1992, Donoghue 2006, Guéguen and Pointillart 2000). A person's diet tends to be quite varied, so these antinutrients will likely have a negligible effect. In a reptile that is fed a limited variety of foods, these antinutrients are encountered more commonly and can have a serious impact on how much calcium is absorbed from the diet. In either scenario, there is just not enough calcium being transported from the digestive tract through the bloodstream to the target organs. The body uses the calcium that is absorbed and bioavailable, but will run short when trying to reach its target blood concentration of calcium, and will resort to depleting more and more calcium from the bone "storehouse." This eventually results in a notable loss of bone density.

- **The dietary ratio of calcium to phosphorus (Ca:P) is incorrect.** Reptiles and amphibians generally need a dietary Ca:P of 1.5-2.0:1.0 (one-and-a-half to twice as much calcium compared to phosphorus). Recall that when too much phosphorus relative to calcium is absorbed it will cause a drop in blood calcium, which initiates the sequence of PTH trying to bring the calcium concentration back to a normal level.
- **The animal does not ingest or cannot make enough of its own vitamin D3.** Recall that this vitamin is essential in the process of absorbing calcium from the diet to correct hypocalcemia. Many species of reptile and amphibian rely heavily on sunlight to produce their own vitamin D3 rather than obtain all of their needed D3 from their diet (Ferguson et al. 2003), and some species cannot absorb dietary D3 and completely rely on

- endogenous vitamin D3 production, including the Green Iguana, *Iguana iguana* (Allen and Oftedal 2003, Bernard et al. 1991). True dietary vitamin D3 deficiencies are rare. Most carnivores tend to be fed whole prey, which is (or was) a healthy animal in itself that was meeting its own D3 quotas. Carnivores that are only fed select portions of a whole animal, such as those being fed only muscle meat, are more susceptible to this kind of problem (Donoghue 2006). The most common scenario for vitamin D3 deficiency involves failing to provide broad spectrum lighting that includes UV-B radiation, or not using these devices appropriately.

Let's revisit NSHP, or nutritional secondary hyperparathyroidism, and why this form of metabolic bone disease applies to most husbandry errors. We've seen above that the parathyroid gland is heavily involved in regulating blood calcium levels; hyperparathyroidism refers to excessive activity of this gland. This syndrome occurs secondary to nutritional factors, such as calcium, phosphorus, and vitamin D3 intake, which is why this disease is considered nutritional.

Clearly, metabolic bone diseases are anything but simple. Next, we will explore how these nutritional and husbandry problems develop into disease, how veterinarians will treat it, and what we can do to prevent it.

Appendix 1: Synonyms for forms of vitamin D3

Compound	Synonyms (not an exhaustive list)
Vitamin D3	Cholecalciferol, calciol
Previtamin D3	Provitamin D3, 7-Dehydrocholesterol
Calcidiol	Calcifediol, hydroxycholecalciferol, 25-hydroxyvitamin D3
Calcitriol	1, 25-dihydroxyvitamin D3

Author Christina Miller CAHT/RVT, RLAT, BSc MBD in Herpetoculture Reprinted with the permission of Christina Miller on Metabolic Bone Disease Companion Animal Hospital (Dartmouth, Canada) with HerpDigest HD does not endorse anything printed in this article, but feels it is an important topic worthy of discussion.



Sent by Jillie Streit, *Litoria caerulea* sells peerless Broome pearls



Henry Cook Madagascar *Boophis viridis*, Andasibe

CANE TOADS WITH PERSONALITY

Cane toads with the personality to boldly go where no cane toad has gone before pave the way for more timid toads to rapidly take over new territories, say Australian researchers. First introduced into Queensland in the 1930s, cane toads are now found as far south as Sydney and as far west as Kununurra. Despite originating from the rainforests of South America, the toads have managed to conquer some of the hottest and driest parts of the Australian continent.

To understand why cane toads continue to venture into new and potentially hostile environments, the scientists put cane toads from a recently established population in the Northern Territory through a mix of behavioural tests. They found that some toads were bold and daring, while others were shy and cautious, they report in the journal [PLoS One](#).

It is this mix of bold and shy personalities that has given the cane toads a foothold in Australia, says study co-author Professor Rick Shine of the University of Sydney. "It is a pretty amazing situation that most frogs are stay-at-home creatures and don't really move too far from where they live, yet here we have got cane toads romping across the landscape" Shine says. "But if cane toads were all timid then presumably they would still be sitting in Queensland."

Full story, ABC Science:

www.abc.net.au/science/articles/2014/08/25/4061479.htm source: HerpDigest_The Only

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HerpDigest.org is a non-profit organization that is totally dependent on your generosity for its continued existence: Please make a donation.



Embrace photo taken by Jillie Street 11/2011

Thanks to Steve from New England Herps Facebook



Hawkesbury Herpetological Society Expo: Sunday 1st March 2015 start time 9 am Penrith Panthers Marquee.
Conservation Through Education and Research PO Box 30, Emerton, NSW, 2770
<http://www.hawkesburyherps.com.au/>



Anti-Santa Defence Device with compliments Andre Rank



Photo by George Madani *Litoria rubella* calling

AUSTRALIAN FROGS

JUMP-STARTING INSULIN PRODUCTION



The humble Australian Blue Mountains tree frog could hold the key to regenerating insulin production in the pancreas. The skin of the frog has a peptide called ‘caerulein’ which researchers in the US have used to regenerate insulin production in the pancreas in a totally new procedure. The skin of the frog has a peptide called ‘caerulein’ which researchers in the US have used to regenerate insulin production in the pancreas in a totally new procedure.

The study showed that when caerulein was given to non-obese diabetic mice whose insulin-producing beta cells had been almost completely destroyed, the alpha cells in their pancreas were converted into beta cells.

The researchers then used the same procedure to test caerulein in pancreatic tissue from humans sourced from the JDRF-sponsored Network for Pancreatic Organ Donors with Diabetes (nPOD), and found strong evidence that caerulein has the same effect in humans.

However, caerulein can cause pancreatitis when given to humans in high enough doses to re-generate beta cells. In order to manage this risk, the next step is to develop a more targeted drug that can be safely given to humans. The researchers are also in the process of developing a way of preventing the body’s immune system from attacking the newly regenerated beta cells.

Original journal article:

<http://www.nature.com/cddis/journal/v5/n7/pdf/cddis2014311a.pdf> Article passed on by Wendy Grimm and Noel and Rae Rosten

FATS MEETINGS commence at 7 pm, (arrive 6.30 pm) and end about 10 pm at the Education Centre, Bicentennial Park, Sydney Olympic Park, Homebush Bay. They are usually held on the **first Friday of every EVEN month** February, April, June, August, October and December (but not Good Friday). Call, check our web site or email us for further directions. We hold 6 informative, informal, topical, practical and free meetings each year. Visitors are welcome. We are actively involved in monitoring frog populations, field studies and trips, have stalls at local events, produce the newsletter FROGCALL and FROGFACTS information sheets. All expressions of opinion and information are published on the basis that they are not to be regarded as an official opinion of the Frog and Tadpole Study Group Committee, unless expressly so stated. **Material from FROGCALL MAY NOT BE REPRODUCED** without the prior consent of the writer, photographer, editor or president of FATS. Permission from FATS and/or author/s must be obtained prior to any commercial use of material. The author/s and sources must be always fully acknowledged.



Thank you to the many Frogcall supporters.

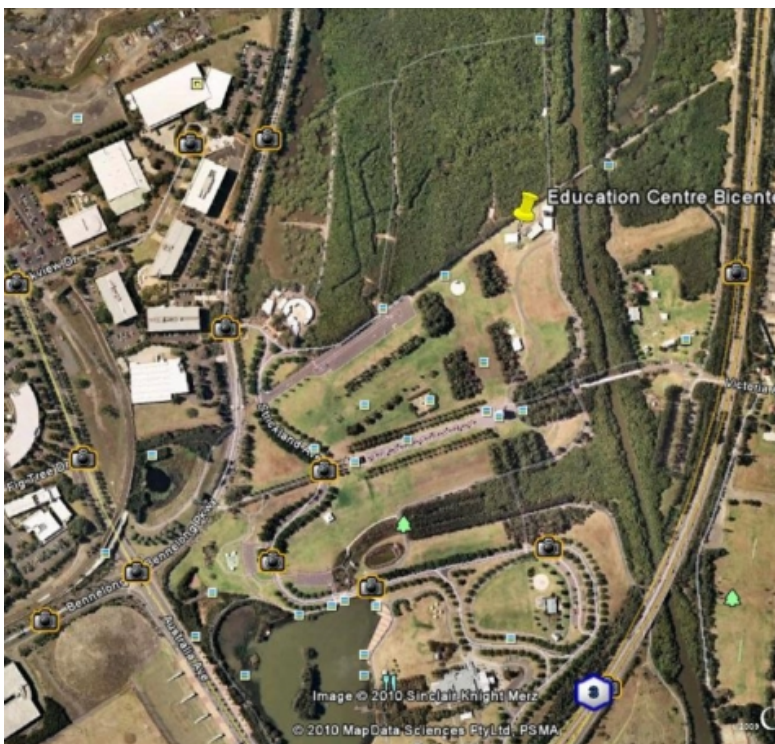
Your articles, photos, media and webpage links, membership administration and envelope preparation is greatly appreciated. Special thanks to regular newsletter contributors, Lothar Voigt, Robert Wall, George Madani, Karen & Arthur White, Andrew Nelson, Wendy & Phillip Grimm, Marion Anstis and Bill Wangmann.



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Field Trips.

Please book your place on field-trips; due to strong demand, numbers are limited. Be sure to leave a contact number. Regardless of prevailing weather conditions, we will continue to schedule and advertise all monthly field-trips as planned. It is YOUR responsibility to re-confirm in the last few days, whether the field trip is proceeding or has been cancelled. Phone Robert on 9681-5308.

27th September 6-45 p.m. West Head, Ku-ring-gai National Park Leader: Grant Webster

Meet at the Duckholes Picnic Area in West Head Rd, near the corner of McCarrs Creek Rd, Terrey Hills.

Frog enthusiasts are aware of the risks that diseases like chytrid and ranavirus pose to our frogs. A less-discussed pathogen is *Phytophthora* ('*fy-toff-thora*'), a plant dieback disease that affects trees and forest understoreys. While not directly impacting on the health of frogs, the pathogen follows groundwater movement along natural land contours, often spreading downslope towards streams and waterbodies. Known to kill fringing vegetation, it is implicated in some frog declines by altering streamside habitat. More recently, the plant disease *Myrtle Rust* has entered the country. It too, has a devastating impact upon our forests and streamside vegetation and is spreading with alarming speed. Tonight we will look at the vulnerability of our frogs in the face of disease, and we will discuss the precautions we need to undertake every time we go frogging, or indeed, enter the bush. We will also discuss some of the difficulties of containing disease in heavily visited areas such as Ku-ring-gai National Park. Grant has conducted much research into our froglife, and has given many interesting talks at FATS meetings. He has a great familiarity with the best frog-sites around West Head and always comes up with something special.

11th October 7-30 p.m. Castlereagh Nature Reserve Leader: Peter Spradbrow

Meet at the Shell Service Station, Richmond Rd, Berkshire Park (opposite Windsor Downs Estate). It is between St Marys Rd and Llandilo Rd.

Travelling Stock Reserves (TSR's) or sometimes called travelling stock routes, were originally an aid to colonial stockmen moving stock around the state. They were simply patches of roadside land set aside by the Crown for the spelling of travelling stock. This state-wide network of paddocks formed stock routes and became colloquially known as the "Long Paddock". While their function and use is largely obsolete today, these largely-unused patches of land, often with valuable remnants of native vegetation along with natural dams and wetlands, have become important refuges for plant and animal life. They also provide important corridors and 'connectivity' between many important wildlife habitats, particularly in those rural areas where native vegetation has been extensively cleared. Recently, authorities have moved to sell off TSR's. Conservation and wildlife groups are continuing to campaign to halt this threat. Tonight, looking within the Sydney metropolitan area, we will examine the importance that patches of roadside vegetation can provide, especially those in a rural setting where the surrounding vegetation has often been extensively cleared.

Peter has had a life-long interest in frogs and reptiles and has become an authority on the herpetofauna of the state. He has an extensive knowledge of the Castlereagh region and tonight promises to be a night full of unusual frogs.

7th-9th November Smiths Lake Camp-Out Leaders: Arthur and Karen White

The word "eco-system" is a much-used word in environmental science. Surprisingly, despite its widespread use, there is no clear definition of this term. An eco-system is however, often likened to the workings of an engine, where many individual parts work together to function as a coherent whole, with each part doing its bit to regulate the performance of the "engine". Most importantly, all parts are essential to the smooth-running of the engine, and there are built-in mechanisms to maintain optimal performance. Remove or alter one part and the engine will either splutter or overheat and eventually cease to function properly. Tonight, we will look at how frogs form part of an eco-system, and how they interact with other parts of a more complex natural system.

Karen and Arthur have a long association with the Smiths Lake area. They know the flora and fauna of the area intimately and we always get a species list that can rarely fit on the blackboard! If you like lots of frogs, reptiles, birds and mammals, this is the week-end for you! Cabin/dormitory accommodation and camping sites available. All kitchen facilities/utensils/crockery supplied. There is a **non-refundable** fee of \$17.50 p.p. per night. Phone Arthur and Karen directly on 9599-1161 for bookings and further details.

In the event of uncertain frogging conditions (e.g. prolonged/severe drought, hazardous and/or torrential rain, bushfires etc.), please phone 9681-5308. Remember!, rain is generally ideal for frogging! Children must be accompanied by an adult. Bring enclosed shoes that can get wet (gumboots are preferable), torch, warm clothing and raincoat. Please be judicious with the use of insect repellent – frogs are very sensitive to chemicals! Please observe all directions that the leader may give. Children are welcome, however please remember that young children especially can become very excited and boisterous at their first frogging experience – parents are asked to help ensure that the leader is able to conduct the trip to everyone's satisfaction. All fieldtrips are strictly for members only – newcomers are however, welcome to take out membership before the commencement of the fieldtrip. All participants accept that there is some inherent risk associated with outdoor fieldtrips and by attending agree to; a release of all claims, a waiver of liability, and an assumption of risk.